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HAMRE, SCHUMANN, MUELLER & LARSON P.C.
P.O. BOX 2902-0902
MINNEAPOLIS, MN 55402

EXAMINER

SONG, MATTHEW J

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1792

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Applicant's arguments filed 1/28/2009 have been fully considered but they are not persuasive.

In response to applicant's argument that the addition of Mg improves reproducibility of the crystal growth, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Applicant teaches on page 3 of the specification that the flux includes Mg and the crystal can have a p-type electrical characteristic and the amount of nitrogen dissolved in the melt is increased because the flux includes Mg (paragraph [0012]). Therefore, Applicant teaches the Mg has two functions, one to dope and one as a flux to increase amount of dissolved nitrogen. Jeong et al teaches the basic mixture is one among magnesium doped to impurity (ET paragraph [26]). Jeong et al is silent to the concentration of the magnesium and Yoshida et al teaches doping with Mg to form a p-type GaN having a desired electrical resistivity, where that amount of dopant overlaps the range taught by applicant. Therefore, the proportion of Mg to the sum of Mg and Na would naturally flow from the teachings of the prior art because the prior art teaches overlapping impurities concentrations in the grow crystal thus would require optimization of the amount of Mg and the amount of Mg is a dopant, thus would tend to be a small proportion of the melt mixture.

It is noted that differences in concentration will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical (MPEP 2144.05). The combination of Jeong et al and Yoshida et al teaches doping Mg into the GaN crystal to obtain a doped crystal, and the amount of dopant

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within the mixture can be determined through routine experimentation to obtain the desired dopant amount. The combination of Jeong et al and Yoshida et al teaches a similar process of crystal growth, as applicant, comprising Na and Mg, where Mg is supplied as a doping impurity and the amount of Mg in the crystal overlaps; therefore the amount of Mg in proportion of Mg and Na would be expected. Applicant also alleges superior crystal quality however there is no comparative evidence of crystal quality.

Applicant's argument that Yoshida et al is directed to a multilayer process and Jeong et al is directed to a GaN monocrystal growth process is noted but not found persuasive. Jeong et al teaches Mg as an impurity in the melt. Yoshida et al is merely relied upon to teach a desirable amount of Mg in a GaN to produce desirable electrical properties. It is well known in the art of crystal growth that dopant is added to a melt to obtain a crystal with a desired amount of dopant (See Ivantsov et al col 6, ln 1-25).

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to applicant's argument that the addition of Mg improves reproducibility of the crystal growth, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when

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the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Applicant teaches on page 3 of the specification that the flux includes Mg and the crystal can have a p-type electrical characteristic and the amount of nitrogen dissolved in the melt is increased because the flux includes Mg (paragraph [0012]). Therefore, Applicant teaches the Mg has two functions, one to dope and one as a flux to increase amount of dissolved nitrogen. Ivantsov et al teaches doping with Mg to form a p-type GaN, where that amount of dopant overlaps the range taught by applicant. Therefore, the proportion of Mg to the sum of Mg and Na would naturally flow from the teachings of the prior art because the prior art teaches overlapping impurities concentrations in the grow crystal thus would require optimization of the amount of Mg and the amount of Mg is a dopant, thus would tend to be a small proportion of the melt mixture.